



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,652	07/17/2007	Marcello Marchesi	MARCHESI5	3126
1444 7590 05/10/2010 BROWDY AND NEIMARK, P.L.L.C. 624 NINTH STREET, NW SUITE 300 WASHINGTON, DC 20001-5303				
EXAMINER				
LOPEZ ALVAREZ, OLVIN				
ART UNIT		PAPER NUMBER		
2121				
MAIL DATE		DELIVERY MODE		
05/10/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/591,652

**Applicant(s)**

MARCHESI, MARCELLO

**Examiner**

OLVIN LOPEZ

**Art Unit**

2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 February 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5, 8-13 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 8-13 and 15-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09/05/2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This office action is in response to **Applicant's arguments filed on** February 02, 2010. Claims 4, 6, 7, and 14 have been cancelled. Claims 1-3, 5, 8-13, and 15-17 have been amended. Therefore, Claims 1-3, 5, 8-13, and 15-17 are still pending in the present application.

### **Priority**

*This application is a National Stage Entry of international Application No. PCT/EP04/11066, filed October 04, 2004 and claims the benefit thereof, which in turn claims priority benefits of Italian application No. MO2004A000050 filed March 03, 2004.*

### **Response to Arguments**

Applicant is reminded of 37 C.F.R. 1.111 (c) which states:

In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

Applicant is reminded of the procedure of amended claims. "Applicant should specifically point out support for any amendments made to the claims and disclosure". See MPEP 714.02 and 2163.06, and 37 CFR 1.111.

*Applicant's argument/remarks, on page 10, with respect to objections to the specification have been fully considered and are persuasive. Therefore, objections to the specification have been withdrawn due to the amendments.*

*Applicant's argument/remarks, on page 10, with respect to objections to the Abstract have been fully considered and are persuasive. Therefore, objections to the Abstract have been withdrawn due to the amendments.*

*Applicant's argument/remarks, on page 10, with respect to objections to the claims have been fully considered and are persuasive. Therefore, objections to the claims have been withdrawn due to the amendments. **See the now objections to the claims below.***

*Applicant's argument/remarks, on page 10, with respect to rejections to claims 10 and 13 under 35 USC § 112 have been fully considered but they are not persuasive. Therefore, rejections to claims 10 and 13 under 35 USC § 112 are sustained. **See the now rejections to the claims below.***

*Applicant's arguments, on pages 10-15, with respect to the rejection(s) of claim(s) 1-3, 5, 8-13, 15-17 under 35 USC 102 (e) and 35 USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.*

*However, upon further consideration, new ground(s) of rejection, **which were necessitated by Applicant's amendments**, are made in view of newly found prior art .*

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "generate a *three dimensional image of a relative position of said handpiece with respect to said portion*". *"comparing said relative position with predefined limit reference positions stored in said electronic processing unit"*, *"indicating any straying of said relative position beyond said limit reference position"*, and any other limitation claimed, **limitations must be shown or the feature(s) canceled from the claim(s).** No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

1. Claim 1 is objected to because of the following informalities:
2. Claim 1 recites the limitations "the position" in line 3, "the upper dental" in line 4, "the lower dental" in line 4, "the position" in line 6, "the image of the portions" in line 18, "the image of the portions" in line 19, "the image of the state" in line 20, "the image that represents" in line 22, "the image or images" in line 23, and "the assisted preparation" in line 41. There is insufficient antecedent basis for these limitation in the claim.  
  
Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 10 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**With regards to claim 1, line 34, recites** “displaying said image on a screen”.

It is unclear to what image is applicant referring to because applicant teaches two different kind of images in line 17.

**With regards to claim 5, lines 1-5, recites** “wherein second reference surface is associated with a handpiece of the probe type in order to create a three-dimensional image of the state of said portion before a dental procedure”. It is unclear if this handpiece is the same as the handpiece recites in claim 1. If this is another and different handpiece not support for it was found in the disclosure. Applicant discloses only a handpiece of probe and/or tool type throughout the specification. There is not support for a second handpiece. Also, this limitation is not taught in the drawings. Examiner is not clear if this image in claim 5 is the same image as recited claim 1 lines 20-21.

**With regard to claim 10 line 4, and claim 13 line 6, recites the term “and/or” within them.** This term makes the claim indefinite because it is subject to more than

one interpretation. For the purposes of examination in this application, this term will be interpreted as “or”.

4. **Claim 16 is rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
5. With regards to claim 16, lines 1-3, recite “wherein said electronic processing unit and said auxiliary electronic processing unit are the same processing unit”. This limitation does not have support in the disclosure and it is considered new matter.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1, 5, 8, 10, 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 20040259057) in view of Luth et al (US 7346417) , in view of Hayka et al (US 5688118) and further in view of Mueller (US 6086366).**



**With respect to claim 1**, Kim teaches a method for generating and processing images for use in dentistry (**see paragraph [0008]**), comprising the steps of:

Kim further teaches acquiring the position of at least one first reference surface (**see Fig. 3 points Mk1, Mk2 and Mk3**), which is associated with at least one portion of either the upper dental arch or the lower dental arch of a patient (**see Fig. 3**);

**Kim does not explicitly teach** acquiring the position of at least one second reference surface, which is associated with at least a handpiece of the tool type operated by a health operator inside the mouth of the patient;

**However, Luth, in an analogous art**, teaches a method comprising acquiring the position of at least one second reference surface (**see Col 6 lines 22 “measuring, storing and computer processing for positioning and orienting the effectors (handpiece of the tool type such as drill or laser, see Col 23 claims 49-50 the acquiring position of the second surface associated with a handpiece is determined), which is** associated with at least a handpiece of the tool type operated by a health operator inside the mouth of the patient (**see Col 6 lines 49-53 controlling and guiding of handpieces for optimally removing tissue as preparation or inlays and onlays**) to controllably remove and process material or tissue and not to remove too much or too little material or tissue during the removal (**see Col 6 14-19**).

**Therefore**, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim's invention and have used a teaches a method comprising acquiring the position of at least one second reference surface (**see Col 6 lines 22 “measuring, storing and**

**computer processing for positioning and orienting the effectors (handpiece of the tool type such as drill or laser, see Col 23 claims 49-50 the acquiring position of the second surface associated with a handpiece is determined), which is** associated with at least a handpiece of the tool type operated by a health operator inside the mouth of the patient (**see Col 6 lines 49-53 controlling and guiding of handpieces for optimally removing tissue as preparation or inlays and onlays**) to controllable remove and process material or tissue and not to remove too much or too little material or tissue during the removal in a patient mouth (**see Col 6 14-19**).

**Kim in view of Luth further teaches wherein said acquiring steps comprise the emission of electromagnetic radiation (see [0006], [0019], and [0034] teaches a CT tomographic apparatus or an MRI apparatus to determine the image and position of surfaces. Moreover, Luth further teaches the acquiring steps comprise the emission of electromagnetic radiation (see Col 23 claims 49-40);**

**Kim in view of Luth further teaches** transducing the acquired positions of said first reference surface and of said second reference surface into signals to be transmitted to an electronic processing unit, in which a CAD software is implemented (**see paragraph [0038] see Fig. 3 the position of a first reference is acquired by measurement instrument 7 and sent to unit body 1 which is processing device. The unit body converts the signals received into a model and displayed as a three dimensional image on a display 5. Moreover, Luth also teaches this limitation in Col 4 lines 45-50 and Col 9 10-15, also see Fig. 8 a control unit receives signals transmitted from a handpiece 1);**

**Kim in view of Luth further teaches** processing, with said processing unit, the transmitted signals in order to generate an image for use in dentistry (**see Fig. 2 and paragraph [0009] lines 5-11, and paragraph [0038] lines 15-18. Moreover, Luth further teaches this limitation in Col 11 lines 37-40 “A control unit 22, preferably a computer with a display 23 (e.g., a display screen with a loudspeaker), is used to read and process the measurement data from the position measurement system 16” and see Col 20 claim 26); and**

**Kim in view of Luth further teaches** generating a three-dimensional image of an application site of a prosthesis, formed in said portion (**see [0013] “the three dimensional image displayed on the display can be changed” and see [0014] and see Fig. 6 and see [0020]-[0021] and [0055]. Moreover, Luth also teaches this limitation in Fig. 2, Fig. 3 and Fig. 4, see Col 9 lines 33-45 an image of the site of a prosthesis is generated that can describe the volume to be cut or removed in the portion of a site measured and processed);**

**Kim in view of Luth further teaches** processing the image of said application site and of at least one image selected from a group that comprises (**see Fig. 6 and [0055]): the image of the portions of the upper dental arch or of the lower dental arch that are adjacent thereto** (**see Fig. 6 (a)-(e) [0055] a model of a dental implant is implanted on the image generated of the prosthesis site to confirm a positional relationship of the dental implant and tissues at the prosthesis site); the image of the portions of the upper dental arch or of lower dental arch that are antagonist thereto; the image of the state of the portion of the upper dental arch or lower dental arch in**

which the application site is formed, before the creation of it; the image that represents the relative motion between the maxilla and the mandible; the image or images of a database of models of teeth, or others;

**Kim in view of Luth further teaches** in order to create, with said CAD software (see [0029] simulation is required to determine the correct position of the implant relative to its adjacent or antagonist portions, see also [0003]), at least one of

1 ) a three-dimensional model of said prosthesis with a shape suitable to reproduce or modify at least one of the occlusal relationship with at least one of said adjacent or antagonist portions and (see [0055] is clearly taught here that a simulation is generated of the implantation of a dental model implant in the prosthesis site to reproduce a model indicating that )  
2) the state of the portion of the upper or lower dental arch in which said application site is formed prior to the creation of it (see [0055]. Moreover, Luth also teaches these limitations. See Col CAD/CAM software is used to determine or process the image of the application site and an image of the state of the application site before the procedure is done, See Fig. 3 and Col 55-67 to Col 10 lines 1-25. The CAD Software is used to integrate a fitted piece and the prosthesis site before the procedure is done, as it is and was known in the art at the time of the invention);

**Kim in view of Luth further teaches** processing, by said processing unit, the transmitted signals in order to generate a three dimensional image of a relative position of said handpiece with respect to said portion (see paragraph [0038] see Fig. 3 the

position of a first reference is acquired by measurement instrument 7 and sent to unit body 1 which is processing device. The unit body converts the signals received into a model and displayed as a three dimensional image on a display 5.

Moreover, Luth also teaches this limitation in Col 4 lines 45-50 and Col 9 10-15, also see Fig. 8 a control unit receives signals transmitted from a handpiece 1. see Col lines 12 lines 15-18 "The position of the hard tissue relative to the measurement markers can be determined by different methods that measure distance or volume or generate surface images". Also see Col 20 claim 26, and see Col 18 claim 3. and finally see Col 1 lines 37-40 "Medical navigation systems are known from computer-assisted surgery which enable to display the position (position and orientation) of the instrument relative to a patient's tissue after registration of the tissue. Also, see Col 4 lines 18-22 "The system is intended to render three-dimensional images of a model jaw with teeth on a display and to represent the positions of the dental tool held by the student on the display relative to the image data of the portion site according to US 5688118).

Kim and Luth combination does not explicitly teach generating a three dimensional image of a relative position of said handpiece with respect to said portion and displaying said image on a screen.

However, Hayka, in an analogous art teaches, a system implementing a method comprising generating a three dimensional image of a relative position of said handpiece with respect to a portion and displaying said image on a screen (see

**Fig. 4 and Col 1 line 9-18)** to monitor in real time an actual dental treatment **(see Col 8 lines 43-45).**

**Therefore**, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim and Luth combination as taught above and have used **a system implementing a method comprising generating a three dimensional image of a relative position of said handpiece with respect to a portion and displaying said image on a screen (see Fig. 4 and Col 1 line 9-18)** as taught By Hayka to monitor in real time an actual dental treatment **(see Col 8 lines 43-45)** and to control the handpiece to work the portion site according to the image displayed in the display **(see Col 6 line 67-Col 7 lines 1-4).**

**However, Kim, Luth and Hayka combination does not explicitly teach**  
comparing said relative position with predefined limit reference positions stored in said electronic processing unit and indicating any straying of said relative position beyond said limit reference position.

**Mueller teaches** a method that includes comparing the acquired relative position with predefined limit reference positions stored in said electronic processing unit **(see Col 9 lines 44-50, and see Col 5 lines 63-65 establishing a defined position between hand-piece and work-piece or preparation site in a predetermined geometry)**, and indicating the straying of said acquired quantity and/or height beyond said maximum and minimum reference values **(see Col 9 lines 46-50 and 53-65)** to control a device in the removal process of dental material and to avoid an accidental pulpotomy **(see Col 1 lines 40-50).**

Therefore, It would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified **Kim, Luth, and Hayka's** combination as taught above and have used a method that includes comparing the acquired relative position with predefined limit reference positions stored in said electronic processing unit (**see Col 9 lines 44-50, and see Col 5 lines 63-65 establishing a defined position between hand-piece and work-piece or preparation site in a predetermined geometry**), and indicating the straying of said acquired quantity and/or height beyond said maximum and minimum reference values (**see Col 9 lines 46-50 and 53-65**) to control a device in the removal process of dental material and to avoid an accidental pulpotomy (**see Col 1 lines 40-50**).

**Kim, Luth, and Hayka, and Mueller further teaches whereby said three-dimensional image of the relative position of said handpiece with respect to said portion is usable for the assisted preparation of said application site in said portion** (**Hayka further teaches in Fig. 4 that this image is usable for the assisted preparation of said application site in said portion, see Col 1 lines 17-19 the system can be used for monitoring a dental treatment performed by a dentist. See Col 12 lines 34-40 such treatments are cavity preparations, crown preparation, root canal preparation, and so on**).

**With respect to claim 5, Kim, Luth, Hayka and Mueller teaches the method according to claim 1, Kim does not explicitly teach wherein second reference surface is associated with a handpiece of the probe type in order to create a three-dimensional**

image of the state of said portion before a dental procedure.

**However, Luth, in an analogous art, teaches a method comprising acquiring the position of at least one second reference surface (see Col 6 lines 22 “measuring, storing and computer processing for positioning and orienting the effectors (handpiece of the tool type such as drill or laser, see Col 23 claims 49-50 the acquiring position of the second surface associated with a handpiece is determined), which is associated with at least a handpiece of the probe type operated by a health operator inside the mouth of the patient in order to create a three-dimensional image of the state of said portion before a dental procedure (see Col 6 lines 49-53 controlling and guiding of handpieces for optimally removing tissue as preparation or inlays and onlays) to controllably remove and process material or tissue and not to remove too much or too little material or tissue during the removal (see Col 6 14-19).**

**Therefore, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim's combination as taught above and have used a teaches a method comprising acquiring the position of at least one second reference surface (see Col 6 lines 22 “measuring, storing and computer processing for positioning and orienting the effectors (handpiece of the tool type such as drill or laser, see Col 23 claims 49-50 the acquiring position of the second surface associated with a handpiece is determined), which is associated with at least a handpiece of the tool type operated by a health operator inside the mouth of the patient (see Col 6 lines 49-53 controlling**



**and guiding of handpieces for optimally removing tissue as preparation or inlays and onlays**) to controllably remove and process material or tissue and not to remove too much or too little material or tissue during the removal in a patient mouth (**see Col 6 14-19**).

**With respect to claim 8, Kim, Luth, Hayka and Mueller** teach the method according to claim 7, **Kim does not explicitly teach** comprising the step of defining a first reference axis in said portion for preparing said application site and a second reference axis of said handpiece.

**Mueller clearly teaches** a method that includes defining a first reference axis in said portion for preparing said application site and a second reference axis of said hand-piece (**see Col 5 lines 63-65 establishing a defined position between hand-piece and work-piece or preparation site in a predetermined geometry**), acquiring the relative position of said second axis with respect to said first axis (**see Col 9 lines 22-40 the position between the hand-piece and the work-piece is determined which were positioned at a fixed geometry space or axis**), comparing the acquired relative position with predefined limit reference positions stored in said electronic processing unit (**see Col 9 lines 46-50**), and indicating the straying of said acquired quantity and/or height beyond said maximum and minimum reference values (**see Col 9 lines 46-50 and 53-65**) to control a device in the removal process of dental material and to avoid an accidental pulpotomy (**see Col 1 lines 40-50**).

Therefore, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified **Kim, Luth, and Hayka** combination as taught above and have used a method that includes defining a first reference axis in said portion for preparing said application site and a second reference axis of said hand-piece (**see Col 5 lines 63-65 establishing a defined position between hand-piece and work-piece or preparation site in a predetermined geometry**), acquiring the relative position of said second axis with respect to said first axis (**see Col 9 lines 22-40 the position between the handpiece and the workpiece is determined which were positioned at a fixed geometry space or axis**), comparing the acquired relative position with predefined limit reference positions stored in said electronic processing unit (**see Col 9 lines 46-50**), and indicating the straying of said acquired quantity and/or height beyond said maximum and minimum reference values (**see Col 9 lines 46-50 and 53-65**) as taught by **Mueller** to control a device in the removal process of dental material and to avoid an accidental pulpotomy (**see Col 1 lines 40-50**).

**With respect to claim 10, Kim, Luth, Hayka and Mueller** teach the method according claim 1, **Kim, Luth, and Hayka does not explicitly teach comprising the steps of:**

detecting the amount of material removed by said hand-piece of the tool type from the tooth or osteointegrated implant being worked in said portion and/or the height thereof;

comparing at least one of said detected quantity and height respectively with a predefinable maximum reference value and with a predefinable minimum reference value; and

indicating the straying of said at least one of said acquired quantity and height beyond said maximum and minimum reference values.

**Mueller** teaches a method that includes detecting the material removed depth by a handheld tool (**see Col 9 line 13-15**), comparing said material removed depth against a desired and predetermined removal depth (**see Col 9 lines 44-47**), and indicating the straying of said acquired quantity and/or height beyond said maximum and minimum reference values (**see Col 9 lines 46-50**) to control a device in the removal process of dental material and to avoid an accidental pulpotomy (**see Col 1 lines 40-50**).

Therefore, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim's combination as taught above and have used a method that includes detecting the material removed depth by a handheld tool (**see Col 9 line 13-15**), comparing said material removed depth against a desired and predetermined removal depth (**see Col 9 lines 44-47**), and indicating the straying of said acquired quantity and/or height beyond said maximum and minimum reference values (**see Col 9 lines 46-50**) as **taught by Mueller** to control a device in the removal process of dental material and to avoid an accidental pulpotomy (**see Col 1 lines 40-50**)

**With respect to claim 12, Kim, Luth, Hayka and Mueller Kim teaches** the method according to claim 1, **Kim further teaches comprising** storing said images in a memory unit associated with said processing unit (**see paragraph [0039] lines 3-4**).

**With respect to claim 13, Kim, Luth, Hayka and Mueller Kim teaches** the method according to claim 1, **Kim further teaches** comprising processing at least one of the image of said application site and the image that represents the relative motion between the maxilla and the mandible of the patient in order to generate (**see paragraph [0039] lines 1-5**), with said CAD software, the three-dimensional model respectively of a prosthesis and/or of a gnathological interarch device (**see paragraph [0055] lines 1-8 and fig 6**).

1. **Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Luth, in view of Hayka, in view of Mueller, and further in view of Duret et al (WO 94/00074) as supported by the Derwent abstract).**

**With respect to claim 2, Kim, Luth, Hayka and Mueller teach** the method according to claim 1, **Kim teaches** wherein said acquiring steps comprises the emission of electromagnetic radiation from said first and second reference surfaces (**see instrument measuring 7 which is a CT apparatus emits radiation from the surface of the instrument to calculate the distance relative between the apparatus 7 and the entity model 6 in Fig. 1**) and the reception of the emitted radiation.

**Moreover, Luth, Hayka and Mueller teach wherein said acquiring steps comprises the emission of electromagnetic radiation from said first surface and the reception of emitted radiation to calculate the relative distance of a tooth or working area to a handpiece as taught above in claim 1).**

**However, Kim, Luth, Hayka and Mueller does not explicitly teach** wherein said acquiring steps comprises the emission of electromagnetic radiation from said first reference surface and the reception of the emitted radiation.

However, **Duret, in an analogous art**, teaches a system implementing a method which comprises the emission of electromagnetic radiation from a first reference and the reception of the emitted radiation to determine the coordinate positions of a transmitter in relation to a receiver for the construction of patient's teeth by correlating three dimensional data of human organs for use in dentistry **(see page 2 line 3-20).**

**Therefore**, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim's combination as taught above invention and have used a system implementing a method which comprises the emission of electromagnetic radiation from said first reference surfaces and the reception of the emitted radiation **as taught by Duret** to determine the coordinate positions of a transmitter in relation to a receiver for the construction of patient's teeth by correlating three dimensional data of human organs for use in dentistry **(see page 2 line 3-20).**

**With respect to claim 3, Kim, Luth, Hayka and Mueller teach** the method according to claim 1, **Kim further teaches** wherein said acquiring steps comprise the emission of electromagnetic radiation toward said first **(see instrument measuring 7 which is a CT apparatus emits radiation from the surface of the instrument towards the first reference surface of the model 6 in Fig. 1)** and second reference surfaces and the reception of the radiation reflected/absorbed by said first and second reference surfaces (the radiation is absorbed/reflected to reproduce an image ).

**Moreover, Luth, Hayka and Mueller teach wherein said acquiring steps comprises the emission of electromagnetic radiation towards said first surface and the reception of the radiation reflected/absorbed by said first reference surface to calculate the relative distance of a tooth or working area to a handpiece as taught above in claim 1).**

**However, Kim, Luth, Hayka** does not explicitly teach wherein said acquiring steps comprise the emission of electromagnetic radiation toward said second reference surfaces and the reception of the radiation reflected/absorbed by said second reference surfaces.

However, **Duret, in an analogous art**, teaches a system implementing a method which comprises the emission of electromagnetic radiation toward **(from a first reference)** a second reference surface and the reception of the emitted radiation to determine the coordinate positions of a transmitter in relation to a receiver for the construction of patient's teeth by correlating three dimensional data of human organs for use in dentistry **(see page 2 line 3-20).**

**Therefore**, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim's combination as taught above invention and have used a system implementing a method which comprises the emission of electromagnetic radiation toward **(from a first reference)** a second reference surface and the reception of the emitted radiation to determine the coordinate positions of a transmitter in relation to a receiver for the construction of patient's teeth by correlating three dimensional data of human organs for use in dentistry **(see page 2 line 3-20)**.

**Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim, in view of Luth et al, and in view of Hayka et al, in view of Mueller et al, and further in view of De Jung et al in (US 20020180953).**

**With respect to claim 9, Kim, Luth, Hayka and Mueller teach** the method according to claim 8, **Kim, Luth, Hayka and Mueller does not explicitly teach** wherein said relative position is defined by the angle of incidence formed by said first and second axes, said limit reference positions being defined by the maximum or minimum breadth of said angle of incidence.

**Jung, in an analogous art**, teaches a method where angle of incidence of the position of a probe from a surface defines the relative position of the probe from the surface and limit reference positions being defined by the maximum or minimum breadth of said angle of incidence can be determined based on the intensity of the **to determine the height of the probe from the surface which may be utilized to**

**compensate** for the intensity of the color/optical measurements and/or utilized to normalize color values light (see paragraph [0184] lines 6-22).

Therefore, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim's combination as taught above and have used a method where angle of incidence of the position of a probe from a surface defines the relative position of the probe from the surface and limit reference positions being defined by the maximum or minimum breadth of said angle of incidence can be determined based on the intensity of the as taught by De Jung to determine the height of the probe from the surface which may be utilized to compensate for the intensity of the color/optical measurements and/or utilized to normalize color values light (see paragraph [0184] lines 6-22).

**Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Luth et al, in view of Hayka et al, in view of Mueller et al and further in view of Boutoussov et al (US 7461982).**

With respect to claim 11, Kim, Luth, Hayka and Mueller teaches the method according to claim 1, Kim does not explicitly teach wherein said electromagnetic radiation belongs to the infrared range.

However, Boutoussov further teaches an illumination device that transmits electromagnetic radiation where said electromagnetic radiation belongs to the infrared range that can be used in dental hygiene procedures for cutting, reforming or treating a surface (see Col 9 lines 28-30 and Col 5 lines 20-23 and Abstract).



**Therefore, it** would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim's combination as taught above and have used an illumination device that transmits electromagnetic radiation where said electromagnetic radiation belongs to the infrared range as taught by **Boutoussov** because can be used in dental hygiene procedures **for cutting, reforming or treating a surface of a patient (see Col 9 lines 28-30 and Col 5 lines 20-23 and Abstract).**

**Claim 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Luth et al, in view of Hayka, in view of Mueller, and further in view of Erdman et al (US 5184306).**

**With respect to claim 15, Kim, Luth, Hayka and Mueller** the method according to claim 1, **Kim, Luth, Hayka and Mueller do not explicitly teach** comprising the steps of:

transmitting said model of said prosthesis or of a gnathological prosthesis to an auxiliary electronic processing unit in which a CAM software is implemented;

extrapolating from said model the coordinates for controlling and actuating an electronically-controlled modeling unit; and

transmitting said coordinates to said modeling unit in order to manufacture said prosthesis or said gnathological prosthesis.

**However, Erdman, in an analogous art, teaches** a method and apparatus where a computer acquires data describing an object and its surroundings, constructs a computer-based three dimensional model of the object from that data, superimposes an ideal geometry on the computer-based model, alters the ideal geometry to fit the form and function required of the reproduction **(extrapolating)**, and then guides a milling machine in the fabrication of the reproduction **(see Col 2 lines 57-64 and Col 11 lines 19-21see figs 1 and 12)**.

**Therefore, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains to have modified Kim's combination as taught above and have used a method where a computer acquires data describing an object and its surroundings, constructs a computer-based three dimensional model of the object from that data, superimposes an ideal geometry on the computer-based model, alters (extrapolating) the ideal geometry to fit the form and function required of the reproduction and then guides a milling machine (modeling unit) in the fabrication of the reproduction (see Col 2 lines 57-64 and Col 11 lines 19-21see figs 1 and 12) as taught by Erdman** for the automated reproduction of three dimensional objects such as prosthesis and as a result reduce enormously the time to fabricate a dental prosthesis.

**With respect to claim 16, Kim, Luth, Hayka and Mueller teach** the method according to claim 15, Erdman further teaches wherein said electronic processing unit and said auxiliary electronic processing unit are the same processing unit **(see Fig. 1**

**elements 10 and 12 the computer 10 that processes CAD software and CAM software is the same. It was well known at the time of the invention that computers had only one processor to process CAD and CAM software, see Kinasi et al (US 5177689), NAKATA (US 5761068), and finally Yang et al (US 6505089)).**

**With respect to claim 17, Kim, Luth, Hayka and Mueller teach** the method according to one or more of the preceding claims, **Kim does not explicitly teach** wherein said modeling unit is a unit for milling a block of material.

However, Erdman further teaches said modeling unit is a unit for milling a block of material (see fig 16, 22, 40 and 41 and see Col 23 lines 35-40) for the fabrication of the reproduction (prosthesis).

### ***Conclusion***

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The reference ***Duret et al (US 4742464)*** discloses ***method of making a dental prosthesis where three dimensional images are generated and processed.***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OLVIN LOPEZ whose telephone number is (571)270-7686. The examiner can normally be reached on Mondays thru Thursdays and alternate Fridays from 7:30 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady, can be reached on (571)-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

Art Unit: 2121

have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

/O. L./  
Examiner, Art Unit 2121

/Albert DeCady/  
Supervisory Patent Examiner, Art  
Unit 2121